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Running title

Environmental and Urinary Arsenic

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List of Abbreviations

As	arsenic
As_{inorg}	inorganic arsenic (As^{III}+As^{V})
As_{methyl}	methylated arsenic (MMA+DMA)
As_{sum}	sum of speciated arsenic compounds (As_{inorg}+As_{methyl})
CI	confidence interval
Crn	creatinine
DMA	dimethylarsinic acid
EPA	Environmental Protection Agency
EC	European Commission
EXPASCAN	Exposure to arsenic and cancer risks in Central and Eastern Europe
IARC	International Agency for Research on Cancer
LD	Limit of detection

MMA	monomethylarsonic acid
NMSC	non-melanoma skin cancer
R^2	fraction of explained variance
SK NCI	National Cancer Institute of Slovakia

Outline of manuscript section headers

ABSTRACT

To assess the arsenic (As) exposure of a population living in the vicinity of a coal-burning power plant with high arsenic emission in the Prievidza District, Slovakia, 548 spot urine samples were speciated for inorganic As (As_{inorg}), monomethylarsonic and dimethylarsinic acid (MMA, DMA) and their sum (As_{sum}). The urine samples were collected from the study population of a case-control study on non-melanoma skin cancer (NMSC). 411 samples with complete As speciations, sufficient urine quality and without fish consumption were passed on to statistical analysis. Although current environmental As exposure and urinary As concentrations were low (median As in soil 41 µg/g within 5 km distance to the power plant; median urinary As_{sum} 5.8 µg/liter), there was a significant but weak association between As in soil and urinary As_{sum} ($r=0.21$, $p<0.01$). A multivariate regression analysis was performed to calculate adjusted regression coefficients for environmental As exposure and other determinants of urinary As. Persons living in the vicinity of the plant had a 27% higher As_{sum} ($p<0.01$), based on elevated concentrations of the methylated species. A 32% increase of MMA occurred among subjects with consumption of home-grown food ($p<0.001$). NMSC cases had significantly higher levels of As_{sum}, DMA and As_{inorg}. The methylation index As_{inorg}/(MMA+DMA) was about 20% lower among cases ($p<0.05$) and in men ($p<0.05$) as compared to controls and females, respectively.